The silent metastasis from breast cancer

Sir, It has for long been known that the marrow of the sternum is a site for breast cancer metastasis. Tumour cells reach it by way of the efferent lymphatic of the internal mammary artery. They do not give rise to any swelling or pain but replicate *in situ* and pass into the general circulation, thus possibly causing further metastases throughout the life of the patient. One would have thought the sternum would be a prime site for irradiation. Yet, according to much discussion and comment in *The Lancet* in the past year and in *JRSM* Supplement No. 9, 1985 (*Bone Metastases from Breast Carcinoma*), sternal metastasis is not so much as mentioned. All attention for treatment is given to the primary site, axillary nodes and other bone metastases.

B D PULLINGER Parkview, South Africa

**Dr Yarnold replies below:*

Sir, In response to Dr Pullinger's query, I would point out that tumour cells from the breast do not pursue a single lymphatic or arterial pathway to any single local site, but disseminate widely in the lymphatic and vascular system at any early stage. I am afraid that there is no evidence to suggest that the marrow of the sternum is ever a sole site of metastasis. This speculative hypothesis has never been tested formally but, as it happens, the sternum has often received full exposure by radiotherapy delivered to the underlying internal mammary chain, especially when an anterior portal has been used to irradiate both sides. In the context of randomized clinical trials evaluating this mode of treatment, no survival advantage has ever been noted for the irradiated group.

J R YARNOLD Royal Marsden Hospital, Sutton, Surrey

Infections caused by opportunistic mycobacteria

Sir, We read with interest the review paper by Grange and Yates (April *JRSM*, p 226). Although they referred to open heart surgery[1] they omitted any reference to implanted valve endocarditis[2-4]. These infections may be attributed to contamination of the tissue at source[5] with inadequate sterilization and screening procedures.

The advent of a new all-British porcine bioprosthesis[6] required careful examination of the levels of tissue contamination, the microbiological screening procedure and the sterilization procedure, since the contamination posed by mycobacteria spp. is compounded by their slow growth and difficulty in detection[7].

Tissue from five hearts collected on any day were stored overnight at 4°C in 0.9% NaCl and screened on the following day for mycobacteria spp. on a weekly basis to indicate the level of tissue contamination. Aortic samples from each porcine bioprosthesis accompany the valve through all the manufacturing and sterilization procedures, including 0.2% and 1% glutaraldehyde and 4% formaldehyde. These aortic samples are used in the microbiological screening.

In order to assess the sterilization, 8 samples were deliberately contaminated with a suspension of mycobacteria at a concentration of 1×10^6 organisms/ml and incubated at 22°C for 20 minutes. They were then sterilized in the same way as the bioprostheses, followed by 96 hours in 4% formaldehyde. All samples were then routinely screened by placing them with an aseptic technique into:

(*a*) Robertson Cooked Meat Medium which was subcultured after 3 and 6 days onto blood agar plates and incubated aerobically and anaerobically
(*b*) Sabouraud Liquid Medium
(*c*) 8% Glycerol in Nutrient Broth
(*d*) Lowenstein-Jensen slope.

All cultures were incubated at 37°C for 6 weeks and observed weekly.

A total of 225 random pig hearts had no positive culture for mycobacteria spp., showing that the tissue contamination is extremely low, and abattoir managers suggest that overt porcine thoracic tuberculosis is very rare. All 8 samples contaminated in the laboratory with *Mycobacterium tuberculosis* and *Mycobacterium xenopi* yielded mycobacteria spp. on culture. The 8 samples contaminated in the laboratory and then treated with the sterilization procedures all failed to yield growth. A total of 2910 bioprostheses have been sterilized and there were no positive cultures of mycobacteria spp.

The review by Grange and Yates emphasizes that we should not be complacent about the possibility of mycobacterial contamination, and there will be a continuing policy of screening for mycobacteria spp.

W H WAIN Wessex Medical Limited
W I GORDON Midhurst, West Sussex
M HAYDON Pathology Department, King Edward VII Hospital, Midhurst

References

1 Kuritsky JN, Bull MG, Broome CV, Silcox VA, Good RC, Wallace RJ. Sternal wound infections and endocarditis due to organisms of the *Mycobacterium fortuitum* complex. *Ann Intern Med* 1983;**98**:938–9
2 Tyras DH, Kaiser GC, Barner HB, Laskowski LF, Marr JJ. Atypical mycobacteria and the xenograft valve. *J Thorac Cardiovasc Surg* 1978;**75**:331–7
3 O'Rourke MF, Shanahan MX, Harkness JL. Endocarditis with an acid fast organism after porcine heart valve replacement. *Lancet* 1978;ii:686
4 Anyanwu CH, Nassau E, Yacoub M. Miliary tuberculosis following homograft valve replacement. *Thorax* 1976;**31**:101–6
5 Centre for Disease Control. Isolation of mycobacteria species from porcine heart valve prostheses. *CDC Morbidity and Mortality Report* 1977;**26**(11 February):42–3
6 Reece IJ, Anderson JD, Wain WH, *et al.* A new porcine bioprosthesis: *in vitro* and *in vivo* evaluation. *Life Support System* 1985;**3**:207–27
7 Lombardo JA, O'Rourke MF, Shanahan MX, Harkness JL. Endocarditis due to an atypical mycobacteria following heart valve replacement. *Aust NZ J Med* 1980;**10**: 432–4

Aids virus infection

Sir, Is the Aids virus the only member of the Lentivirinae family in addition to maedi-visna of sheep, infectious anaemia virus of horses, and caperine arthritis-encephalitis of goat[1]? Or is bovine visna virus, cultured in leukaemic bone marrow in 1977[2], another member of the family?

It is the gospel of the United States NIH that the AIDS virus arose spontaneously in monkeys – animals not commonly known to harbour visna-like

viruses or known to be adversely affected by the AIDS virus until they are inoculated.

Most likely the AIDS virus arose by hetrodimer recombination of bovine leukaemia virus and visna virus in a commonly infected host cell. Furthermore, it seems more probable that the virus expanded its host range and perhaps replicative rate (trivialities to those initiated in reaction rate kinetics of retrovirus recombination) by culture growth in malignant bone marrow tissue.

Where is the sorcerer to banish the flood created by the apprentices of the World Health Organization and United States National Institute of Health?

When the retrovirus strains, oncogenic genes and transacting genes are added to the airborne human DNA viral genomes in combination with host cell information, we all will regret the infinitely culturable HeLa.

ROBERT B STRECKER
Preferred Risk Partners Inc
Glendale, California, USA

References

1 Seale J. AIDS virus infection: prognosis and transmision. *J. R. Soc Med* 1985;78:613–4
2 Georgiades JA, Billiau A, Vanderschueren B. Infection of human cell cultures with bovine visna virus. *J Gen Virol* 1978;38:375–81

Haematuria due to urinary bladder metastases from carcinoma of the bronchus

Sir, The correspondence in your columns on this subject (December 1985 *JRSM*, p 1053 and April 1986, p 250) brings to mind a patient of mine who presented with haematuria early in 1981. He appeared to be a healthy 80-year-old and it was not considered justified to investigate his haematuria.

Some months later he developed a skin ulcer in the lumbar region. This was a secondary deposit from a carcinoma of the bronchus, which grew rapidly. He died two months later in spite of treatment.

It is unusual for carcinoma of the bronchus to present with haematuria.

G S PLAUT
London SW17

Joan of Arc, creative psychopath: is there another explanation?

Sir, I read with interest Dr Ratnasuriya's intriguing comments about Joan of Arc (April *JRSM*, p 234) and, during a recent visit to the imposing ruins of Chinon Castle, I could not help considering the amazing fact that she was ever accepted by the Court of Charles VII. At any rate, I would like to offer yet another explanation: the full account is in *Joan of Arc and her Secret Missions* by Pierre de Sermoise. This theory, in brief, is that Joan was the illegitimate daughter of Louis of Orleans and Isabella of Bavaria (brother and wife of Charles VI). This is certainly possible given the personalities of these members of the then French royal family! Such a person would have been accepted, had access to the knowledge of conducting warfare and been able to afford the extremely expensive armour which she wore.

During her trial Joan was never put to physical torture, which would be in keeping with Sermoise's view that that was a put-up job and that Joan was not burnt at the stake but that a witch victim was substituted at the last moment. This was why she was so covered up – again a very unusual occurrence, for the guilty were usually openly paraded as an '*aut de fa*' so as to discourage the others.

Certainly, I would recommend the ideas of Pierre de Sermoise. I think that those people who postulate a physical illness have to explain how Joan could cope with the rigours of mediaeval warfare, and those who postulate a mental illness have to explain how she was accepted as a leader so rapidly.

Perhaps Shakespeare had it right (*Henry VI*, part 1):

> 'Not me begotten of a shepherd swain
> But issu'd from the progeny of Kings'.

JOHN B BOWES
Department of Anaesthetics
Frenchay Hospital, Bristol

Sir, The evidence given by Dr Ratnasuriya (April *JRSM*, p 234) for Joan of Arc's behaviour being based upon a tubercular pathogenesis is interesting but rather unconvincing. Although it would be only supporting evidence, I do not think that it is recorded that she had or had had scrofula, which seems always to have been the commonest manifestation of bovine tuberculosis. Further, while I cannot account for her intestines, there is good literary evidence of the presumably normal heart surviving incineration of all other tissues including bone. I quote from Trelawney's account of the immolation of Shelley's five-week dead body on the beach near Viareggio: 'The only portions that were not consumed were some fragments of bones, the jaw, and the skull; but what surprised us all was that the heart remained entire'.

Finally, I do think Joan's cachexia and amenorrhoea are much more likely to have been due to anorexia nervosa – relatively recently recognized but I am quite sure already existent in the 15th century.

D A MOORE
Medical Services Director
Scottish & Newcastle Breweries
(Services) Limited, Edinbugh

**Dr Ratnasuriya replies below:*

Sir, The explanation that Joan of Arc had tuberculosis takes into account that she suffered from the illness during her late childhood and the tuberculoma developed later, as is evidenced by the fact that she first heard voices when she was about 13. She then recovered from the illness, as is possible with tuberculosis[1,2], which was why she was able to cope with the rigours of warfare.

R H RATNASURIYA
Maudsley Hospital,
London SE5

References

1 Anderson JR, ed. *Muir's textbook of pathology*. 11th ed. London Edward Arnold, 1980: 207–8
2 Water JB, Israel MS. *General pathology*. 5th ed. London: Churchill Livingstone, 1979: 242.